

AMENDMENTS TO THE SPECIFICATION:

Kindly amend the specification as follows:

1. Please replace the paragraph added beneath the Title on page 1 by the Preliminary Amendment dated December 16, 2003, with the following new paragraph:

This application is a divisional of U.S. Patent Application Serial No. 10/123,140, filed April 17, 2002, which is now U.S. Patent No. 6,681,835 B2, and claims priority from Japanese Patent Application Nos. 130781/2001 and 130792/2001, both filed April 27, 2001, the entire disclosures of which are incorporated herein by reference.

2. Please replace the paragraph on page 1, line 21, to page 2, line 6, which begins with “The supercharger rotor...,” with the following new paragraph:

The supercharger rotor also comprises a profile portion 3 having the helical portions 1a and 2a, and a shaft 4 penetrating the profile portion 3. The profile portion 3 is normally made of aluminum, and the shaft 4 of steel. Accordingly, in order to firmly connect the profile portion 3 with the shaft 4, conventionally, metal bonding means have been employed to execute aluminizing for the shaft side, and connecting the shaft made of steel with the profile portion made of aluminum. In this case, since the shaft 4 and the profile portion 3 are connected with each other by metal bonding, the rotor must be maintained at a high temperature for a long time.

3. Please replace the paragraph on page 6, lines 7-11, which begins with “Furthermore, ...,” with the following new paragraph:

Furthermore, compared with gravity casting, in die-casting, there are no feeder heads, and accuracy is high. Thus, it is possible to reduce processing costs by making ~~an~~ extra thickness small (e.g., about 0.5mm), and greatly reducing a processing margin.

4. Please replace the paragraph on page 6, line 23, to page 7, line 4, which begins with “In order to achieve...,” with the following new paragraph:

In order to achieve the second object, in accordance with the present invention, there is provided a method for manufacturing a supercharger rotor by casting a profile portion (21a) of a supercharger rotor (21) and a shaft (22) penetrating the same, comprising the steps of: (~~A~~~~D~~) first processing a left and right helical cross portion (23) on a surface of the shaft connected to the profile portion; and (~~B~~~~E~~) casting the profile portion (21a) around the shaft in die-casting.

5. Please replace the paragraph on page 7, lines 10-16, which begins with “According to the method...,” with the following new paragraph:

According to the method of the present invention, by forming a groove in the shaft, when casting is executed in die-casting, aluminum is surely injected by a casting pressure into the cross groove portion (23) formed on the surface of the shaft 22, and a sufficient fastening force is provided by mechanical connection.

6. Please replace the paragraph on page 9, line 20, to page 10, line 2, which begins with “The pair of end...,” with the following new paragraph:

The pair of end metal molds 14 and 15 respectively have shaft cavities 14a and 15a for housing the rotor shaft. The rotor shaft (not shown) having a left and right handed helical cross portion formed on a surface in a range of being shorter than a body length of the profile portion 11a is fitted in the cavities. In this state, the cavity 13 equivalent to the body length and a body outer periphery of the profile portion forming both ends 11b (not shown, see Fig. 4) of the rotor is formed.

7. Please replace the paragraph on page 10, line 18, to page 11, line 3, which begins with “The rotary pulling-out...,” with the following new paragraph:

The rotary pulling-out device 18 pulls out the end metal mold 14 having the above-described helical core by rotating it along the helical line. This rotary pulling-out device 18 includes, for example, a rotary shaft 18a attached to the end metal mold 14 and extended in an axial direction, a helical guide (not shown) for guiding the rotary shaft 18a along a helical line similar to that of the helical core, and a rack and pinion device (not shown) for rotating the rotary shaft 18a around an axial center. In the drawing, a reference numeral 17 denotes a guide plate for the end metal mold 14 having the helical core, and the helical guide, not shown, may be provided in this guide plate.

8. Please replace the paragraph on page 11, line 23, to page 12, line 20, which begins with “In the manufacturing...,” with the following new paragraph:

In the manufacturing method of the supercharger rotor of the present invention, before the cavity formation step_(A), a rotor shaft processing step may be provided to process a left

and right helical cross portion on a surface of the rotor shaft in a range shorter than a body length of a profile portion 11a. This left and right helical cross portion includes a right handed screw helical groove and a left handed screw helical groove cut by, for example a lathe. The cross portion is formed by crossing these with each other. The screw by cutting is a 10-thread screw having a pitch of, e.g., 1mm, and has a normal angle shape. In lathe work, a plurality of cutting tools are used in parallel, and multiple thread screws are simultaneously processed or processed by shifting cutter positions by a plurality of times. ~~Other than cutting by using the lathe, for example knurling may be carried out.~~ By providing the rotor shaft processing step of forming the left and right cross portion on the surface of the rotor shaft in the range shorter than the body length of the profile portion 11a, when the rotor shaft is cast-coated in die-casting, aluminum is surely injected by a casting pressure into the cross groove portion formed on the surface of the rotor shaft, and a sufficient fastening force is provided by mechanical connection.

9. Please replace the paragraph on page 16, lines 7-20, which begins with "According to the above-described...", with the following new paragraph:

According to the above-described method of the present invention, by forming a groove in the shaft 22, when casting is executed in die-casting, aluminum is surely injected by a casting pressure into the cross groove portion 23 formed on the surface of the shaft 22, and a sufficient fastening force is provided by mechanical connection. Therefore, the conventional aluminizing to the shaft side is made unnecessary, and groove formation and penetrating are also made unnecessary. The number of processing steps is accordingly reduced, and extra components are made unnecessary. As a result, it is possible to firmly connect the profile portion and the shaft with each other inexpensively and efficiently.